

**THE TAMILNADU Dr.M.G.R. MEDICAL UNIVERSITY,
No.69, Anna Salai, Guindy, Chennai – 600 032.**

**D.M/ M.Ch
SUPER SPECIALTY DEGREE COURSE**



SYLLABUS AND CURRICULUM

2017-2018

M.Ch – NEURO SURGERY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI**Syllabus - M.Ch. NEURO SURGERY****1.AIMS:**

The syllabus for M.Ch.Neurosurgery course should comprehensively cover all the subjects pertaining to Basic Neurosciences, Clinical Neurology, Clinical Neurosurgery and Operative Neurosurgery.

2.OBJECTIVES:

To train and assess the candidate in

- a. Understanding of the neuroanatomical and neurophysiological basis of neurological disease
- b. Understanding of neuropathology of neurological disease
- c. Evaluating a patient with neurological symptoms
- d. Clinical examination of a patient with neurological symptoms and arriving at a clinical diagnosis
- e. Ordering appropriate investigations pertaining to possible differential diagnosis arrived at
- f. Ability to evaluate the neuroradiological and other investigations to arrive at a diagnosis
- g. Preoperative work up and planning
- h. Operative skills for basic neurosurgical procedures
- i. Postoperative management of the patient
- j. Management of patient at follow up with appropriate adjuvant therapy and investigations
- k. Formulate a research question, write a research proposal and carry out a prospective/retrospective study and publish its results

3.THEORY SYLLABUS:

There will be two streams:

- *6 years Course for post-MBBS candidates (General Surgery 1 year + Neurosurgery 5 years)*

- *3 years Course for post-MS (General Surgery) candidates*

The evaluation will be in **three** parts for the 6 years course with examinations as follows:

Part I: General Surgery at the end of the first year

Part II: Basic Neurosciences and Clinical Neurology at the end of the third year

Part III: Neurosurgery at the end of the sixth year

The evaluation will be in **one part** for the 3 years course, with examination being conducted at the end of three years.

The Candidates appearing for Part III Examination of 6 years M.Ch Neurosurgery course and 3 years M.Ch Neurosurgery post M.S course will have the same practical scheme of examination.

PART I (6 years course)

- Will undergo training in basic principles in General Surgery
- Will preferably be posted for at least 2 months in a Head and Neck Surgery unit for exposure to the anatomy of Head and Neck
- Will undergo an examination at the end of first year of the course in :
 - Paper 1 – Basic Sciences in relation to General Surgery
 - Paper 2 – General Surgery
- Will undergo Clinical and viva voce examination in General Surgery

PART II (6 years course)

Neuroanatomy

- Embryology of the nervous system
- Descriptive gross and microscopic anatomy
- Cross sectional anatomy relevant to interpretation of CT/MRI
- Microsurgical anatomy in relation to various operative approaches

Neurophysiology

- Physiology of intracranial pressure

- Physiology of motor, sensory systems and understanding the basis for clinical signs/symptoms in pathological states
- Physiology of autonomic nervous system
- Physiological basis for EEG, Evoked potentials and nerve conduction/Electromyography studies
- Interpretation of EEG/ Evoked potential studies

Neurochemistry

- General principles of Neurochemistry
- Neurotransmitters – Their distribution, synthesis and functions
- Neuroreceptors and their actions
- Biochemical changes in trauma and ischemia

Neuropathology

- Pathological changes in congenital, traumatic, inflammatory, infectious and neoplastic illnesses of the central and peripheral nervous system
- Latest WHO classification of brain tumours and their clinical relevance
- Basic molecular classification of brain tumours and their clinical relevance
- Basic knowledge of principles of immunohistochemistry and its role in classification of brain neoplasms
- Bacteriology, Virology and Parasitology with reference to common neurological infections

Neuropharmacology

- Will acquire knowledge of pharmacokinetics of the following agents and should be able to outline the indications, dosages and common side effects of
 - Anti epileptics
 - Analgesics
 - Anti oedema agents
 - Drugs used in Parkinson's disease
 - Common agents used for sedation and anaesthesia
 - Antipsychotic agents

- Chemotherapeutic agents used in Neuro oncology
- Common antibiotics and anti tuberculous agents
- Anticoagulants, antiplatelet agents and thrombolytics
- IV contrast agents

Clinical Neurology

- History taking and detailed clinical neurological examination of a patient with a neurological symptom, including patients in altered sensorium
- Interpretation of the clinical signs elicited in arriving at a clinical diagnosis
- Skill to distinguish neurosurgical illnesses from illnesses that may mimic a neurosurgical condition
- Concept of Brain death and its significance
- Interpretation of plain Xrays of the skull and spine as well as CT/MRI of brain and spine
- Adequate hands-on experience in performing
 - Lumbar Puncture
 - External ventricular drainage
 - Invasive monitoring of intracranial pressure
 - Transcranial Doppler
 - Nerve conduction study and electromyography
 - Electrode placement for monitoring evoked potentials and EEG
- Will undergo a theory examination at the end of three years of the 6 year course in
 - Paper I : Neuroanatomy and Neurophysiology
 - Paper II: Neurochemistry and Neuropathology
 - Paper III: Clinical Neurology
- Will undergo Clinical and Viva voce examinations in Clinical Neurology at the end of three years of the 6 year course.

The syllabus listed above (Part II) will be completed in two years i.e. during the second and third year of the 6 year course and the first two years of the 3 year course. There will be two months posting in the Neurology Unit during this period.

It is recommended that there be an additional 15 days posting in a Clinical Neurophysiology laboratory during the third year of the 6 year course and second year of the 3 year course.

PART III (6 year course)

There will be no set syllabus for this part. The candidate appearing for this part is expected to have a thorough knowledge of all the aspects covered above in Part II and in addition the following:

- History of neurosurgery especially its development in India
- Recent advances and Basic research methods in Neurosurgery
- Principles behind the working of operating microscope, Laser, Ultrasonic aspirator, Endoscopy, stereotaxy, neuronavigation and any newer developments in operative adjuncts used in the operating room
- Basic principles and techniques of radiation therapy in relation to neurosurgery, including radiosurgery
- Basic principles in diagnostic and interventional neuroradiology
- Acquaintance with recent neurosurgical literature and critically evaluate a journal article
- Basic operative skills
- Skills in decision making in common scenarios after neurosurgical operations

The examiners shall also bear in mind in the evaluation of the results of the Part-III examination whether the candidate is of such high merit as to be able to teach and train other neurosurgeons in course of time and whether his skill, knowledge, clinical acumen and surgical judgement is of such high order that decisions and management regarding neurosurgically ill patients can be entrusted safely to him.

The candidates will have at least one month posting in neurosurgical centres other than the one they are training in and two weeks each in Radiodiagnosis and Radiotherapy.

The final examination (Part III for six year course) will have two theory papers. The examination for 3 year course will have four theory papers, details of which are provided in the last section. Clinical and viva voce examinations will also be conducted.

Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

4. CLINICAL TRAINING

- Training on patient evaluation, decision making and management will be inculcated during day-to-day management of patients in the ward, emergency department and operating room
- The candidate will spend at least one month in one or more neurosurgical centres other than the college where they are training in.
- Two weeks each in Radiodiagnosis and Radiotherapy.

- During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

5.SKILL TRAINING

At the end of third year of 6 year course OR first year of 3 year course

Should have assisted the following	Should have performed the following
Craniotomies Decompressive craniectomies Laminectomies Anterior cervical approaches	Suturing scalp lacerations Opening and closure of the scalp Craniotomy using multiple burr holes and gigli saw Ventriculoperitoneal shunt insertion Evacuation of chronic subdural haematoma Lumbar subarachnoid drain insertion External ventricular drain insertion Application of skull traction

At the end of six year of 6 year course OR third year of 3 year course

Should have assisted the following	Should have performed the following
All skull base and vascular procedures including aneurysm clipping Excision of superficial and deep seated intra axial and extra axial brain tumours Excision of brain tumours in	Decompressive craniectomies Excision of low grade glioma/convexity meningioma on the surface in non eloquent regions Excision of brain abscess Lumbar and cervical discectomy Laminectomy for spinal tumours

eloquent location Excision of spinal cord tumours Spine instrumentation	Releasing CSF from cisterns for tumours (under supervision)
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6.TEACHING METHODOLOGY

- Ward rounds, case presentations and discussions
- Combined academic sessions with Neurologists
- Periodic audits of surgical cases will be conducted to expose the postgraduate resident to various aspects of management of cases such as complications and their avoidance and to evaluate outcomes
- Periodic inter departmental meetings will be conducted to train the patient in recent developments in Radiology, Radiation therapy and Rehabilitation
- Interdepartmental meetings with other specialities such as Radiology, Radiation Therapy, PMR and Endocrinology
- Weekly journal club
- Review of progress of thesis and other research work once in six months
- Teaching undergraduates and paramedical staff
- Participation in workshops and conferences
- Training in use and maintenance of equipments

7.RESEARCH WORK

- The candidate will be trained to acquire the skill to
 - Frame a research question
 - Devise a methodology to answer the question
 - Collect the relevant information and analyse it
 - Evaluate appropriately the collected data to draw a conclusion
- The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities to fulfil the above objectives would consist of

- Planning and organizing relevant animal / clinical studies to be submitted as a dissertation at the end of the course.

Students should attend Research Methodology workshop within first 6 months, M.Ch Course conducted by the University.

8. LOG BOOK:

Logbook showing the details of neurosurgical procedures assisted and performed, journal club presentations, attendances in conferences and workshops, paper presentations and publications periodically signed by the faculty at the level of Associate professor or above should be produced at the time of Clinical and Oral Examination.

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Assessment of both theory and practicals at the end of every unit / posting.

9. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks
Total		----- 50 Marks -----

For 3 years M.Ch. Neurosurgery:

- Assessment I - February - First year
- II - August - First year
- III - February - Second Year
- IV - August - Second year
- V - February - Third Year
- VI - May - Third Year

For 6 years M.Ch. Neurosurgery:

- Assessment I - February - First year
- II - August - First year
- III - February - Second Year
- IV - August - Second year
- V - February - Third Year
- VI - August - Third Year
- VII - February - Fourth year
- VIII - August - Fourth year
- IX - February - Fifth year
- X - August - Fifth year
- XI - February - Sixth year
- XII - May - Sixth year

Note: Competency Assessment mark for 6th year student will be added only at the end of 6 years with Final year examination.

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10. THEORY EXAMINATION:**M.Ch. (Neurosurgery) Six years course (for post-MBBS candidates)**

Each theory paper will be for 100 marks.

Part I: General Surgery: At the end of 1st year***Theory***

Paper I : Applied Basic Sciences in relation to General Surgery

Paper II : General Surgery

Practicals (Scheme for M.Ch. Neuro Surgery Six years – PART- I)

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	30
Short Case	2 Cases x 15 Minutes	30 Minutes	40 (20x2)
Ward Rounds	2 Patients x 5 Minutes	10 Minutes	20 (10x2)
OSCE	2 STATIONS	10 Minutes each	10(5x2)
Oral			100

Part II: Basic Sciences in Neurology and Clinical Neurology: At the end of 3rd year

Theory

Paper I : Neuroanatomy and Neurophysiology

Paper II: Neurochemistry and Neuropathology

Paper III : Clinical Neurology

Practicals (Scheme for M.Ch. Neuro Surgery Six years – PART- II)

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
Viva Voce		15 Minutes	50
OSCE	5 Stations x 3 Minutes	15 Minutes	50
			400

Part III: Neurosurgery: At the end of 6th year

Theory

Paper I : Neuroradiology and Clinical Neurosurgery

Paper II : Operative Neurosurgery and Recent advances

Practicals

Practicals (Scheme for M.Ch. Neuro Surgery Six years – PART- III)

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

Clinical Examination and Ward Round in Neurosurgery Oral Examinations in Neuroradiology and Neurosurgery.

Periodical Evaluation of Log Book and Dissertation/Thesis

“13. 9 A postgraduate student of a postgraduate degree course in broad specialities/Super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.”

Further it was resolved that the candidates should submit the **dissertation** at the end of VI year, i.e., 6 months prior to the Theory examination.

Regarding to evaluation of the dissertation, the dissertation evaluation shall be as approved or not approved. There will be no marks for the dissertation.

M.Ch. (Neurosurgery) Three years course (for post-MS candidates)

There will be a single examination at the end of three years.

Theory

Paper I: Neuroanatomy, Neurophysiology, Neurochemistry and Neuropathology

Paper II : Clinical Neurology

Paper III : Neuroradiology and Clinical Neurosurgery

Paper IV: Operative Neurosurgery and Recent advances

Practicals

Clinical and Oral Examinations in Neurosurgery

Periodical Evaluation of Log Book.

11. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine cases	Time for examiners to question candidate	Maximum marks
Long case	1 case x 60 minutes	60 minutes	100
Short case	2 cases x 15 minutes each	30 minutes	100
Ward rounds	3 patients x 10 minutes	30 minutes	100
OSCE	5 stations x 3 minutes each	15 minutes	50
Viva voce		15 minutes	100
Log book		15 minutes	50
Total			500

13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

12. OSCE (5 stations):

1. Operative Surgery - Photograph x 3
2. Clinical Photograph
3. Counselling of a patient for a major surgical intervention

13. REFERENCE BOOKS:

1. Carpenter's Human Neuroanatomy
2. Kandell and Schwartz. Essentials of Neuroscience
3. Ganong. Medical Physiology
4. Plum & Posner's Diagnosis of stupor and coma
5. Dejong's Neurological Examination
6. Youman's Neurological Surgery
7. Schmidek and Sweet. Operative Neurosurgical Techniques Volumes 1 and 2.
8. Rhoton's Cranial Anatomy and Surgical Approaches
9. Benzel's Spine Surgery Volumes 1 and 2.
10. www.neurosurgicalatlas.com

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS

Neurology India

Journal of Neurosurgery

Journal of Neurosurgery: Spine

Journal of Neurosurgery: Pediatrics

World Neurosurgery

Neurosurgical Focus

Neurosurgery

British Journal of Neurosurgery